

## Comprehensive Solar Sail Simulation, Phase I

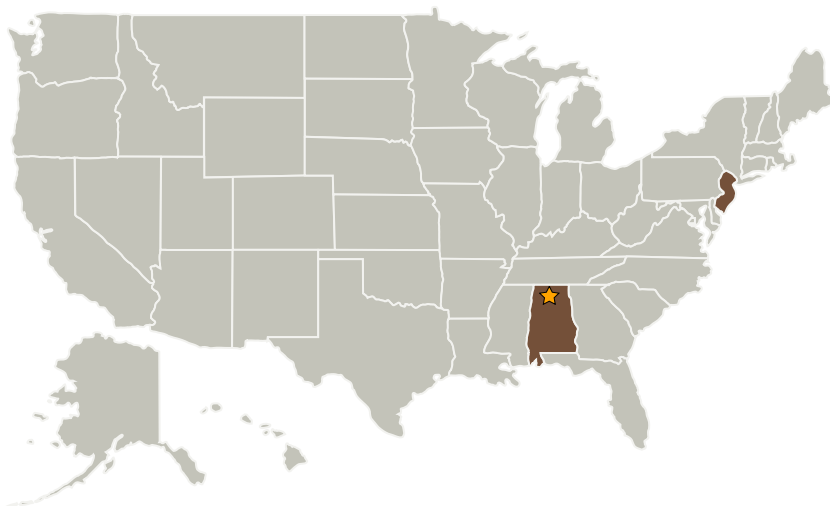
Completed Technology Project (2006 - 2006)



## Project Introduction

Solar sails as a propulsive device have several potential applications: providing access to previously inaccessible orbits, longer mission times, and increased payload mass. NASA has identified a need for better simulations of sail-enabled missions to reduce the cost and risk associated with sail development. PSS has a unique capability due to our previous work in sail modeling and high-fidelity simulation. The simulation must model maneuvering, navigation, trajectory control, propulsive performance, and operations, which represents wide range of capability. PSS meets this capability for solar sails by integrating sail shape models for disturbance computation with attitude and orbit dynamics, first in MATLAB and then in the proposed C++ real-time simulation. The real-time simulation will provide users the ability to duplicate their MATLAB models in an environment to which they can attach hardware and flight software. This innovative package will support mission development from the earliest stages of analysis through flight operations. The same solar sail simulation will be used for mission planning and operator training. ATK Space Systems will consult on the project and develop refined models of propulsive performance of real sails, considering wrinkles, crinkles, billow, and manufacturing-induced asymmetries.

## Primary U.S. Work Locations and Key Partners



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## Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Organizational Responsibility	1
Project Management	2
Technology Areas	2

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Marshall Space Flight Center (MSFC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Marshall Space Flight Center (MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Princeton Satellite Systems	Supporting Organization	Industry	Plainsboro, New Jersey

## Primary U.S. Work Locations

Alabama	New Jersey
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX01 Propulsion Systems
  - └ TX01.4 Advanced Propulsion
    - └ TX01.4.1 Solar Sails